

AMENDMENTS TO THE DRAWINGS

Enclosed with this Amendment is a Replacement Sheet for Sheet 3 of the drawings. In the Replacement Sheet, reference numeral 63 is removed from original Fig. 6 and replaced with reference numeral 67.

REMARKS

This Amendment is being filed responsive to the February 23, 2005 Office action issued in connection with the above-identified patent application. Prior to entry of the above amendments, claims 1-31 were pending, with claims 1-4, 6, and 9-31 rejected and claims 5 and 7-8 withdrawn from consideration. By the above amendments, claims 1 and 21 are amended, and new claims 32-37 are added.

In the Office action, the specification was objected to for not containing the current status of all referenced applications. The specification has been amended, as presented above, to reflect the current status of each referenced application. More specifically, U.S. Patent Application Serial No. 09/190,917 is now identified as U.S. Patent No. 6,376,113, and U.S. Patent Application Serial No. 09/291,447 is now identified as U.S. Patent No. 6,221,117.

In the Office action, the specification was objected to for containing inconsistent numbering of elements (e.g., "heating assembly 63" and "heating assembly 67"). Accordingly, Applicants propose amending Fig. 6 to replace reference numeral 63 with reference numeral 67. A replacement sheet for original sheet 3 of the drawings is enclosed with this Amendment and includes this change to Fig. 6. In addition, Applicants propose amending the specification at page 15, line 15, to replace reference numeral 63 with reference numeral 67 to reflect the change in Fig. 6. Applicants are appreciative of the Examiner's attention to detail in recognizing the above-noted inconsistencies between the drawings and the written specification.

In the Office action, the drawings were objected to for containing reference numeral 14, which was not mentioned in the description. Upon review of the

specification and drawings, Applicants note that reference numeral 14 is discussed in the specification at page 3, line 20 (noting "...one or more feed streams 14 to a fuel processor 16"). Accordingly, Applicants request reconsideration and withdrawal of this latter objection to the original disclosure.

In the Office action, claims 1-4, 6, 10, 13-17, 21-22, 24-28, and 30-31 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,409,046 to Swenson et al. ("Swenson"). Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Swenson in view of U.S. Patent No. 2,551,501 to Mitchell, et al. ("Mitchell"). Claims 11-12 and 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Swenson. Claims 18-20 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Swenson in view of U.S. Patent No. 5,938,800 to Verrill et al. ("Verrill"). Claims 1-4, 6, and 9-31 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-66 of U.S. Patent No. 6,375,906, and also as being unpatentable over claims 1-50 of co-pending U.S. Patent Application Serial No. 10/126,557.

Applicants have studied the cited references in view of the pending claims and the reasons expressed in the Office action. Applicants respectfully disagree that the subject matter of all of the original claims was anticipated or rendered obvious by the cited references. However, Applicants have made various clarifying amendments to the claims, as presented above and as discussed below, to more clearly recite subject matter that is neither disclosed by nor suggested in the cited references, individually or in any permitted combination thereof.

Applicants agree with the Examiner that Swenson discloses a delivery system for a volatile feedstock, such as natural gas. However, Applicants respectfully disagree with the Examiner that Swenson discloses a fuel processing system with a feedstock delivery system, much less the fuel processing system recited in Applicants' amended claims 1 and 21. The Examiner asserts that natural gas-burning transportation vehicles disclosed in Swenson are fuel processors of a volatile hydrocarbon feedstock because transportation vehicles exhaust a product stream in which detectable amounts of hydrogen gas may be found. Applicants submit that a vehicle with an internal combustion engine is not fairly considered to be a fuel processor. However, Applicants have amended claims 1 and 21 to clarify that the subject matter of claims 1 and 21 is directed to a hydrogen-producing fuel processing system comprising a fuel processor that is adapted to produce a product gas stream that contains hydrogen gas as the majority component. In view of this clarifying amendment to independent claims 1 and 21, Applicants submit that the claims patentably distinguish Swenson. Applicants further submit that Swenson cannot render the fuel processing systems of claims 1 and 21 obvious because Swenson fails to disclose or suggest any form of fuel processor that is adapted to produce hydrogen gas. At most, and accepting for the purpose of this response that a trace amount of hydrogen gas may be present in the combustion exhaust stream of the engines of Swenson, Swenson discloses a fuel processor that is adapted to receive and combust a volatile feedstock to generate motive forces. The trace hydrogen that may be produced is incidental and the engines are not fairly considered to be "adapted to produce" hydrogen gas. Accordingly, Applicants submit that amended claims 1 and 21 patentably distinguish Swenson.

Applicants note that several of the pending dependent claims stand rejected under 35 U.S.C. § 103 as being obvious over a proposed combination of Swenson in view of Verrill. Applicants agree that Verrill discloses a hydrogen-producing fuel processor. However, Applicants submit that amended claims 1 and 21 recite fuel processing systems that are neither disclosed nor suggested by the proposed combination of Swenson and Verrill, nor Swenson in combination with another hydrogen-producing fuel processor. As discussed in more detail below, Swenson fails to disclose or suggest recited elements of the claimed volatile feedstock delivery system and therefore cannot disclose the recited fuel processing systems of claim 1 and 21 even if combined with a hydrogen-generating fuel processor instead of a vehicle with an internal combustion engine.

Amended claim 1 recites a hydrogen-producing fuel processing system that includes a volatile feedstock delivery system that is adapted to deliver a heated output stream of a volatile carbon-containing feedstock to a fuel processor and a fuel processor that receives the heated output stream and produces a product hydrogen gas stream therefrom. For the Examiner's convenience, amended independent claim 1 is reproduced below.

1. (Currently amended) A fuel processing system, comprising:
 - a volatile feedstock delivery system, comprising:
 - a plurality of heated reservoirs adapted to receive and store under pressure a volume of a volatile carbon-containing feedstock;
 - a heating assembly adapted to heat the plurality of reservoirs; and
 - a delivery system adapted to selectively deliver ~~[[an]]~~a heated output stream containing feedstock from a selected one of the reservoirs; and
 - ~~a heating assembly adapted to heat the plurality of reservoirs; and~~

a fuel processor adapted to receive the heated output stream and to produce a product gas stream primarily containing hydrogen gas therefrom.

Amended independent claim 1 recites, amongst other subject matter, a fuel processing system with a volatile feedstock delivery system comprising a plurality of heated reservoirs, a heating assembly to heat the plurality of reservoirs, a delivery system to deliver a heated output stream from one of the reservoirs, and a fuel processor adapted to receive the heated output stream and to produce a product gas stream primarily containing hydrogen gas therefrom.

Similar to amended claim 1, amended independent claim 21 also recites a fuel processing system that includes a fuel processor that is adapted to produce a product hydrogen gas stream from a volatile carbon-containing feedstock, and a feed assembly that is adapted to deliver the feedstock to the fuel processor. Amended independent claim 21 is reproduced below for the Examiner's convenience.

21. (Currently amended) A fuel processing system, comprising:

a fuel processor adapted to produce a product gas stream primarily containing hydrogen gas from a feedstock;

a feed assembly adapted to deliver the feedstock at a selected pressure to the fuel processor, wherein the feed assembly includes a volatile feedstock feed system, comprising:

a plurality of reservoirs adapted to receive and store under pressure a volume of a volatile carbon-containing feedstock;

a delivery system ~~including~~ adapted to draw a feed stream from a selected one of the reservoirs as a heated liquid stream, wherein the delivery system includes a delivery valve assembly adapted to selectively deliver to the fuel processor the feed stream containing volatile carbon-containing feedstock from ~~the~~ selected one of the reservoirs at a pressure at least as great as the selected pressure;

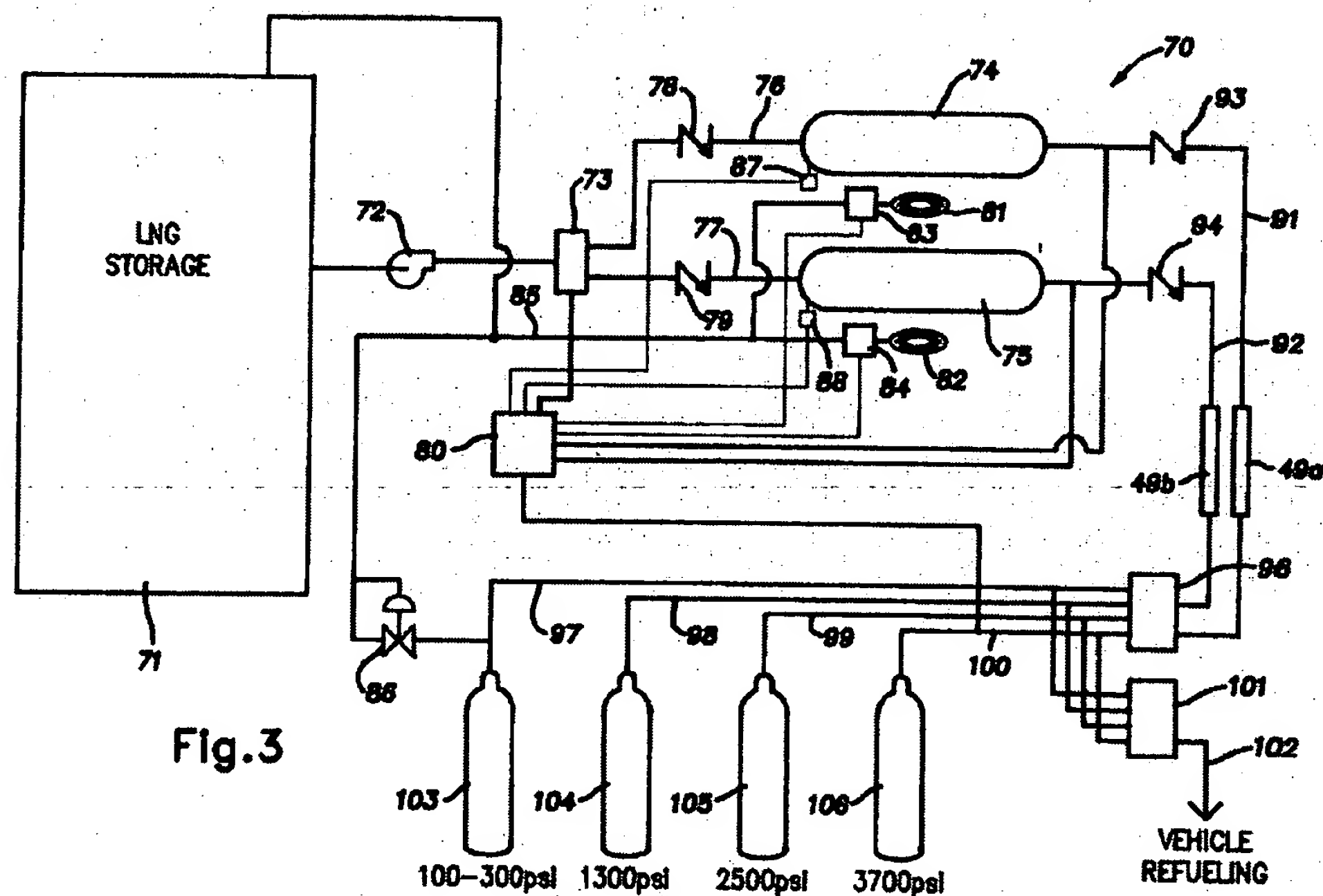
a supply system including a supply valve assembly adapted to selectively fill the reservoirs with the volatile carbon-containing feedstock; and

a heating assembly adapted to selectively heat the plurality of reservoirs to maintain the pressure of the volatile carbon-containing feedstock in the reservoirs at or above the selected pressure.

Amended independent claim 21 recites, amongst other subject matter, a fuel processing system with a fuel processor that is adapted to produce a product hydrogen gas stream from a volatile carbon-containing feedstock, a feed assembly that is adapted to deliver the feedstock to the fuel processor and which includes a volatile feedstock delivery system comprising a plurality of reservoirs and a delivery system adapted to draw a feed stream from one of the reservoirs as a heated liquid stream, a supply system adapted to fill the reservoirs with feedstock, and a heating assembly adapted to selectively heat the plurality of reservoirs to maintain a selected pressure of the feedstock.

As discussed above, Applicants agree with the Examiner that Swenson discloses a volatile feedstock delivery system that includes a plurality of reservoirs that are adapted to store the feedstock, and a delivery system adapted to draw a feed stream from a selected one of the reservoirs. Swenson also discloses a heating assembly that is adapted to heat the plurality of reservoirs. However, Swenson does not disclose or suggest a fuel processing system with the delivery system recited in either amended claim 1 or amended claim 21. Amongst other subject matter, amended independent claim 1 recites that the delivery system is adapted to deliver to the fuel processor a heated output stream containing a feedstock from a selected one of the reservoirs, and amended independent claim 21 recites that the delivery system is adapted to draw from a selected one of the reservoirs a heated liquid feed stream which is eventually received by the fuel processor.

In contrast, Swenson discloses a delivery system that provides a cooled, gaseous output stream of volatile carbon-containing feedstock. Swenson discloses several configurations of its delivery system. Each of these configurations is adapted to deliver a gaseous output stream from a plurality of pressurized tanks 103-106 that contain different pressures of the feedstock. An exemplary embodiment, shown in Swenson Figure 3, is reproduced below for the Examiner's convenience.



With reference to the above Figure, the system of Swenson includes conversion tanks 74, 75 that provide gaseous feedstock to cascade tanks 103, 104, 105, 106 via supply tubing 91, 92, heat exchangers 49a, 49b, and priority panel 96. In the disclosure of Swenson, conversion tanks 74, 75 are used to convert liquid natural gas to high-pressure natural gas vapor through the application of heat from burners 81, 82 (col. 4, lines 64-66). The supercritical vapor in conversion tanks 74, 75 is then cooled ("tempered"; col. 5, lines

41-42 and col. 6, lines 14-16) on its way to cascade tanks 103-106, where the gas is stored at various predetermined pressures. The plurality of cascade tanks are then used to supply pressurized gaseous feedstock for rapid refueling of a transportation vehicle. The focus of Swenson is that a series of pressurized tanks of gaseous fuel may be used to more effectively recharge the fuel tank of a vehicle than a single tank containing only high-pressure fuel.

Swenson fails to disclose the delivery systems recited in amended claim 1 and amended claim 21. As noted above, the only heated reservoirs of Swenson are conversion tanks 74 and 75, with cascade tanks 103-106 being unheated according to the disclosure of Swenson. Swenson teaches that the supercritical vapor created in the conversion tanks must be cooled by the heat exchangers before being allocated among the cascade tanks that will later be used to refuel a vehicle. Also, the physics of the Swenson delivery system suggest that the gaseous feedstock will cool even more as its pressure drops during delivery from the conversion tanks to the cascade tanks. Accordingly, it follows that Swenson fails to disclose, suggest, or teach the delivery of a heated output stream to the fuel processor, as recited in amended claim 1.

As also noted above, Swenson teaches that the output stream delivered from the supply system is in gaseous form (col. 5, lines 36-48). Providing a gaseous supply stream from the delivery system of Swenson is required for its function, as the gas must finally reach a pressure at least as high as the working pressure of the gas in the tank of the vehicle being refueled (col. 5, lines 64-66). Delivering a liquid output stream to the fuel processor would defeat the disclosed purpose of using the conversion tanks of Swenson to produce a high-pressure gaseous fuel stream. As such, Swenson does not disclose,

suggest, or teach drawing a heated liquid output stream from a selected one of the reservoirs, as recited in amended claim 21.

For at least these reasons, Applicants submit that amended claims 1 and 21 recite subject matter that is neither disclosed in nor suggested by the cited references. As such, and upon consideration of amended claims 1 and 21, Applicants request that the rejections of original claims 1 and 21 be withdrawn and amended claims 1 and 21 be allowed.

Claims 2-20 and 22-37 depend from either amended claim 1 or amended claim 21 and therefore should be allowed when amended claim 1 and amended claim 21 are allowed.

As a final matter, Applicants request reconsideration of the obviousness-type double patenting rejections made in the Office action. In the Office action, the pending claims were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-66 of U.S. Patent No. 6,375,906, and also as being unpatentable over claims 1-50 of co-pending U.S. Patent Application Serial No. 10/126,557. Applicants agree with the Examiner that the cited references disclose fuel processing systems with feedstock delivery systems that are adapted to deliver streams of carbon-containing feedstock to hydrogen-producing fuel processors. However, Applicants request reconsideration and withdrawal of these double patenting rejections because the cited references recite subject matter that is distinct from the subject matter of the pending claims. Specifically, the cited references are directed to feedstock delivery systems that include heated tanks of water through which gaseous hydrocarbons are bubbled to produce a humidified gaseous feed stream for the fuel processor.

However, as a result of this construction, the delivery systems are not adapted to receive and store under pressure a volume of a volatile carbon-containing feedstock (as recited in independent claims 1 and 21), much less to produce a liquid stream of carbon-containing feedstock, as recited in amended independent claim 21. Accordingly, Applicants respectfully request reconsideration and withdrawal of the obviousness-type double patenting rejections.

In view of the above, Applicants submit that all of the issues raised in the Office action have been addressed. If there are any remaining issues or if the Examiner has any questions, Applicants' undersigned attorney may be reached at the number listed below. Similarly, if the Examiner believes that a telephone interview may be productive in advancing prosecution of the present application, the Examiner is invited to contact Applicants' undersigned attorney at the number listed below.

Respectfully submitted,

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